

CLAIMS

Now, therefore, at least the following is claimed:

1. A radio frequency cable network device that implements at least one gateway service, the device comprising:
 - at least one RF cable interface that is attachable to at least one RF cable, the at least one RF cable being at least part of an RF cable data network, the at least one RF cable at least providing downstream communications in the RF cable data network, the RF cable data network providing bi-directional data connectivity between the RF cable network device at a customer premise and a cable modem termination device;
 - at least one customer premise data interface that is electromagnetically connectable to at least one customer premise data communications medium, the at least one customer premise data communications medium further being electromagnetically connectable to at least one first customer premise equipment (CPE) data device, the at least one RF cable interface and the at least one customer premise data interface capable of providing at least part of a communications facility that can be used in a conveyance of data between the at least one first CPE data device and the at least one RF cable interface;
 - logic configured to store information identifying at least one IP address, the at least one IP address being assigned to the RF cable network device;
 - logic configured to forward packets containing IP datagrams between the RF cable network and at least one first customer premise equipment (CPE) data device; and
 - logic configured to provide at least one gateway service to the at least one first CPE data device, the at least one gateway service facilitating

communications of the at least one first CPE data device that are
carried in IP datagrams over the RF cable data network.

2. The RF cable network device of claim 1, wherein the RF cable data network further comprises at least one telco return path that at least provides upstream communications in the RF cable data network.
3. The RF cable network device of claim 1, wherein the at least one gateway service is selected from the group consisting of: network address translation (NAT), firewall, proxy, tunneling, and virtual private networking (VPN).
4. The RF cable network device of claim 3, wherein the NAT gateway service performs at least one type of NAT selected from the group consisting of: traditional NAT, basic NAT, network address-port translation (NAPT), bi-directional NAT, and twice NAT.
5. The RF cable network device of claim 1, wherein the at least one gateway service is selected the group consisting of: firewall and proxy.
6. The RF cable network device of claim 5, wherein the firewall gateway service performs at least one of the firewall types selected from the group consisting of: packet-filtering, circuit-level gateway, and application layer gateway.
7. The RF cable network device of claim 6, wherein the packet-filtering firewall type provides network security utilizing a state-based packet inspection to protect the at least first CPE data device.
8. The RF cable network device of claim 5, wherein the at least one gateway service performs at least one of the gateway service types selected from the group consisting of: circuit-level gateway and application layer gateway.

- 1 9. The RF cable network device of claim 8, wherein the at least one gateway service
2 proxies at least one session of the at least one first CPE data device, the at least one
3 session communicated by the at least one first CPE data device over the at least one
4 customer premise data communications medium, and the at least one session
5 communicated through the RF cable network device and into the RF cable network.
- 1 10. The RF cable network device of claim 3 further comprising logic configured
2 dynamically assign at least one customer network IP address to the at least one first
3 CPE data device.
- 1 11. The RF cable network device of claim 10, wherein the logic configured to
2 dynamically assign at least one customer network IP address comprises Dynamic Host
3 Configuration Protocol (DHCP) server logic.
- 1 12. The RF cable network device of claim 10, wherein the at least one customer network
2 IP address is from a different IP address realm than the at least one IP address for RF
3 cable data network access.
- 1 13. The RF cable network device of claim 3, wherein the RF cable network device
2 appears on the RF cable data network to be the same as an ethernet attached cable
3 modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service
4 Interface Specification) standard.

14. The RF cable network device of claim 3, wherein the RF cable network device is a set-top box (STB) that further comprises:
 - at least one audio/video (A/V) customer premise equipment (CPE) interface that is electromagnetically connectable to at least one customer premise audio/video (A/V) communications medium;
 - logic configured to select at least one audio/video (A/V) program that is communicated to the at least one RF cable interface over at least one RF cable audio/visual (A/V) network;
 - logic configured to receive the selected at least one A/V program from the RF cable A/V network; and
 - logic configured to provide the received at least one A/V program to at least one audio/video (A/V) customer premise equipment (CPE) device that is electromagnetically connectable to the at least one customer premise A/V communications medium, the at least one A/V program communicated through the at least one A/V CPE interface and over the at least one customer premise A/V communications medium.
15. The set-top box of claim 14, wherein the at least one A/V CPE device is selected from the group consisting of: a television, a video recorder, a stereo, and an audio recorder.
16. The set-top box of claim 14, wherein the set-top box appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.
17. The set-top box of claim 16, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the set-top box further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also

5 considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address
6 being different from the at least one DOCSIS CM IP address.

1 18. The set-top box of claim 14, wherein the set-top box appears on the RF cable data
2 network to conform to at least one version of a DAVIC (Digital Audio Visual
3 Council) cable modem standard.

1 19. The set-top box of claim 14, wherein at least one option card is added to a base unit of
2 the set-top box to provide at least support to the at least one gateway service.

1 20. The RF cable network device of claim 3, wherein the RF cable network device is a
2 cable modem (CM).

1 21. The cable modem of claim 20, wherein the cable modem (CM) appears on the RF
2 cable data network to be the same as an ethernet attached cable modem that conforms
3 to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification)
4 standard.

1 22. The cable modem of claim 21, wherein the at least one IP address is at least one
2 DOCSIS customer premise equipment (CPE) IP address, the cable modem further
3 comprising logic configured to store information identifying at least one DOCSIS
4 cable modem (CM) IP address, the at least one DOCSIS CM IP address also
5 considered to be assigned to the cable modem, the at least one DOCSIS CPE IP
6 address being different from the at least one DOCSIS CM IP address.

1 23. The cable modem of claim 20, wherein the cable modem (CM) appears on the RF
2 cable data network to conform to at least one version of a DAVIC (Digital Audio
3 Visual Council) cable modem standard.

24. The cable modem of claim 20, wherein at least one option card is added to a base unit of the cable modem to provide at least support to the at least one gateway service.

25. A radio frequency (RF) cable network device configured to provide data connectivity over an RF cable network, the device comprising:

at least one RF cable interface that is attachable to at least one RF cable, the at least one RF cable being at least part of an RF cable data network, the at least one RF cable at least providing downstream communications in the RF cable data network, the RF cable data network providing bi-directional data connectivity between the RF cable network device at a customer premise and a cable modem termination device;

at least one customer premise data interface that is electromagnetically connectable to at least one customer premise data communications medium, the at least one customer premise data communications medium further being electromagnetically connectable to at least one first customer premise equipment (CPE) data device, the at least one RF cable interface and the at least one customer premise data interface capable of providing at least part of a communications facility that can be used in a conveyance of data between the at least one first CPE data device and the at least one RF cable interface;

logic configured to forward data between the at least one RF cable interface and the at least one customer premise data interface;

logic configured to frequency-division multiplex the data over the at least one customer premise data communications medium, which is at least one wired customer premise data communications medium.

26. The RF cable network device of claim 25, wherein option cards are added to a base unit of the RF cable network device to support the at least one wired customer premise data communications medium.

- 1 27. The RF cable network device of claim 25, wherein the RF cable network device
2 appears on the RF cable data network to be the same as an ethernet attached cable
3 modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service
4 Interface Specification) standard.
- 1 28. The RF cable network device of claim 25, wherein the at least one wired customer
2 premise data communications medium is telephone wiring at the customer premise,
3 and wherein the data is frequency-division multiplexed with a signal for carrying an
4 analog POTS voice-frequency band signal.
- 1 29. The RF cable network device of claim 25, wherein the at least one wired customer
2 premise data communications medium is electrical power wiring at the customer
3 premise, and wherein the data is frequency-division multiplexed with a signal for
4 carrying electrical power to appliances at the customer premise.
- 1 30. The RF cable network device of claim 25, wherein the RF cable network device is a
2 set-top box (STB) that further comprises:
3 at least one audio/video (A/V) customer premise equipment (CPE) interface
4 that is electromagnetically connectable to at least one customer
5 premise audio/video (A/V) communications medium;
6 logic configured to select at least one audio/video (A/V) program that is
7 communicated to the at least one RF cable interface over at least one
8 RF cable audio/visual (A/V) network;
9 logic configured to receive the selected at least one A/V program from the RF
10 cable A/V network; and
11 logic configured to provide the received at least one A/V program to at least
12 one audio/video (A/V) customer premise equipment (CPE) device that
13 is electromagnetically connectable to the at least one customer premise
14 A/V communications medium, the at least one A/V program

communicated through the at least one A/V CPE interface and over the
at least one customer premise A/V communications medium.

31. The set-top box of claim 30, wherein the at least one A/V CPE device is selected from the group consisting of: a television, a video recorder, a stereo, and an audio recorder.

32. The set-top box of claim 30 that implements at least one gateway service by further comprising:
logic configured to provide at least one gateway service to the at least one first CPE data device, the at least one gateway service facilitating communications of the at least one first CPE data device that are carried in IP datagrams over the RF cable data network.

33. The set-top box of claim 32, wherein the at least one gateway service is selected from the group consisting of: network address translation (NAT), firewall, proxy, tunneling, and virtual private networking (VPN).

34. The set-top box of claim 33, wherein the RF cable network device appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

35. The RF cable network device of claim 25, wherein the RF cable network device is a cable modem (CM).

36. The cable modem of claim 35 that implements at least one gateway service by further comprising:
logic configured to provide at least one gateway service to the at least one first CPE data device, the at least one gateway service facilitating communications of the at least one first CPE data device that are carried in IP datagrams over the RF cable data network.

- 1 37. The cable modem of claim 36, wherein the at least one gateway service is selected
 2 from the group consisting of: network address translation (NAT), firewall, proxy,
 3 tunneling, and virtual private networking (VPN).
- 1 38. The cable modem of claim 37, wherein the RF cable network device appears on the
 2 RF cable data network to be the same as an ethernet attached cable modem that
 3 conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface
 4 Specification) standard.
- 1 39. A radio frequency (RF) cable network device configured to provide data connectivity
 2 over an RF cable network, the device comprising:
 3 at least one RF cable interface that is attachable to at least one RF cable, the at
 4 least one RF cable being at least part of an RF cable data network, the
 5 at least one RF cable at least providing downstream communications in
 6 the RF cable data network, the RF cable data network providing bi-
 7 directional data connectivity between the RF cable network device at a
 8 customer premise and a cable modem termination device;
 9 at least one customer premise data interface that is electromagnetically
 10 connectable to at least one customer premise data communications
 11 medium, the at least one customer premise data communications
 12 medium further being electromagnetically connectable to at least one
 13 first customer premise equipment (CPE) data device, the at least one
 14 RF cable interface and the at least one customer premise data interface
 15 capable of providing at least part of a communications facility that can
 16 be used in a conveyance of data between the at least one first CPE data
 17 device and the at least one RF cable interface;
 18 logic configured to forward data between the at least one RF cable interface
 19 and the at least one customer premise data interface, the at least one
 20 customer premise data communications medium being at least one
 21 wireless customer premise data communications medium.

1 40. The RF cable network device of claim 39, wherein option cards are added to a base
2 unit of the RF cable network device to support the at least one wireless customer
3 premise data communications medium.

1 41. The RF cable network device of claim 39, wherein the RF cable network device
2 appears on the RF cable data network to be the same as an ethernet attached cable
3 modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service
4 Interface Specification) standard.

1 42. The RF cable network device of claim 41, wherein the at least one wireless customer
2 premise data communications medium conforms to at least one version of at least one
3 protocol selected from the group consisting of: Bluetooth, IEEE 802.11a, IEEE
4 802.11b, and HomeRF.

1 43. The RF cable network device of claim 39, wherein the at least one wireless customer
2 premise data communications medium conforms to at least one version of at least one
3 protocol selected from the group consisting of: Bluetooth, IEEE 802.11a, IEEE
4 802.11b, and HomeRF.

- 1 44. A set-top box (STB) comprising:
- 2 at least one RF cable interface that is attachable to at least one RF cable
- 3 audio/visual (A/V) network;
- 4 at least one audio/video (A/V) customer premise equipment (CPE) interface
- 5 that is electromagnetically connectable to at least one customer
- 6 premise audio/video (A/V) communications medium;
- 7 logic configured to select at least one audio/video (A/V) program that is
- 8 communicated to the at least one RF cable interface over the at least
- 9 one RF cable audio/visual (A/V) network;
- 10 logic configured to receive the selected at least one A/V program from the RF
- 11 cable A/V network;
- 12 logic configured to provide the received at least one A/V program to at least
- 13 one audio/video (A/V) customer premise equipment (CPE) device that
- 14 is electromagnetically connectable to the at least one customer premise
- 15 A/V communications medium, the at least one A/V program
- 16 communicated through the at least one A/V CPE interface and over the
- 17 at least one customer premise A/V communications medium;
- 18 at least one RF cable interface that is attachable to at least one RF cable, the at
- 19 least one RF cable being at least part of an RF cable data network, the
- 20 at least one RF cable at least providing downstream communications in
- 21 the RF cable data network, the RF cable data network providing bi-
- 22 directional data connectivity between the RF cable network device at a
- 23 customer premise and a cable modem termination device;
- 24 logic configured to store information identifying at least one IP address, the at
- 25 least one IP address being assigned to the set-top box; and
- 26 logic configured to forward packets containing IP datagrams from the set-top
- 27 box over the RF cable data network.

- 1 45. The set-top box of claim 44, wherein the at least one A/V CPE device is selected from
2 the group consisting of: a television, a video recorder, a stereo, and an audio recorder.
- 1 46. The set-top box of claim 44, wherein the set-top box appears on the RF cable data
2 network to be the same as an ethernet attached cable modem that conforms to at least
3 one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.
- 1 47. The set-top box of claim 46, wherein the at least one IP address is at least one
2 DOCSIS customer premise equipment (CPE) IP address, the set-top box further
3 comprising logic configured to store information identifying at least one DOCSIS
4 cable modem (CM) IP address, the at least one DOCSIS CM IP address also
5 considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address
6 being different from the at least one DOCSIS CM IP address.
- 1 48. The set-top box of claim 44 further comprising:
2 at least one customer premise data interface that is electromagnetically
3 connectable to at least one customer premise data communications
4 medium, the at least one customer premise data communications
5 medium further being electromagnetically connectable to at least one
6 first customer premise equipment (CPE) data device, the at least one
7 RF cable interface and the at least one customer premise data interface
8 capable of providing at least part of a communications facility that can
9 be used in a conveyance of data between the at least one first CPE data
10 device and the at least one RF cable interface.
- 1 49. The set-top box of claim 48, wherein the set-top box appears on the RF cable data
2 network to be the same as an ethernet attached cable modem that conforms to at least
3 one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

1 50. The set-top box of claim 49, wherein the at least one IP address is at least one
 2 DOCSIS customer premise equipment (CPE) IP address, the set-top box further
 3 comprising logic configured to store information identifying at least one DOCSIS
 4 cable modem (CM) IP address, the at least one DOCSIS CM IP address also
 5 considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address
 6 being different from the at least one DOCSIS CM IP address.

1 51. The set-top box of claim 48 further comprising:
 2 logic configured to provide at least one gateway service to the at least one first
 3 CPE data device, the at least one gateway service facilitating
 4 communications of the at least one first CPE data device that are
 5 carried in IP datagrams over the RF cable data network.

1 52. The set-top box of claim 51, wherein the at least one gateway service is selected from
 2 the group consisting of: network address translation (NAT), firewall, proxy, tunneling,
 3 and virtual private networking (VPN).

1 53. The set-top box of claim 52, wherein the set-top box appears on the RF cable data
 2 network to be the same as an ethernet attached cable modem that conforms to at least
 3 one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

54. The set-top box of claim 53, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the set-top box further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

- 1 55. A method of implementing at least one gateway service in a radio frequency (RF)
 2 cable network device, the method comprising the steps performed in the RF cable
 3 network device of:
- 4 providing at least one RF cable interface that is attachable to at least one RF
 5 cable, the at least one RF cable being at least part of an RF cable data
 6 network, the at least one RF cable at least providing downstream
 7 communications in the RF cable data network, the RF cable data
 8 network providing bi-directional data connectivity between the RF
 9 cable network device at a customer premise and a cable modem
 10 termination device;
- 11 providing at least one customer premise data interface that is
 12 electromagnetically connectable to at least one customer premise data
 13 communications medium, the at least one customer premise data
 14 communications medium further being electromagnetically
 15 connectable to at least one first customer premise equipment (CPE)
 16 data device, the at least one RF cable interface and the at least one
 17 customer premise data interface capable of providing at least part of a
 18 communications facility that can be used in a conveyance of data
 19 between the at least one first CPE data device and the at least one RF
 20 cable interface;
- 21 storing information identifying at least one IP address, the at least one IP
 22 address being assigned to the RF cable network device;
- 23 forwarding packets containing IP datagrams between the RF cable network
 24 and at least one first customer premise equipment (CPE) data device;
 25 and
- 26 providing at least one gateway service to the at least one first CPE data device,
 27 the at least one gateway service facilitating communications of the at
 28 least one first CPE data device that are carried in IP datagrams over the
 29 RF cable data network.

- 1 56. The method of claim 55, wherein the RF cable data network further comprises at least
2 one telco return path that at least provides upstream communications in the RF cable
3 data network.
- 1 57. The method of claim 55, wherein the at least one gateway service is selected from the
2 group consisting of: network address translation (NAT), firewall, proxy, tunneling,
3 and virtual private networking (VPN).
- 1 58. The method of claim 55, wherein the RF cable network device appears on the RF
2 cable data network to be the same as an ethernet attached cable modem that conforms
3 to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification)
4 standard.

1 59. A method of providing data connectivity over an RF cable network, the method
 2 comprising the steps performed in a radio frequency (RF) cable network device of:
 3 providing at least one RF cable interface that is attachable to at least one RF
 4 cable, the at least one RF cable being at least part of an RF cable data
 5 network, the at least one RF cable at least providing downstream
 6 communications in the RF cable data network, the RF cable data
 7 network providing bi-directional data connectivity between the RF
 8 cable network device at a customer premise and a cable modem
 9 termination device;
 10 providing at least one customer premise data interface that is
 11 electromagnetically connectable to at least one customer premise data
 12 communications medium, the at least one customer premise data
 13 communications medium further being electromagnetically
 14 connectable to at least one first customer premise equipment (CPE)
 15 data device, the at least one RF cable interface and the at least one
 16 customer premise data interface capable of providing at least part of a
 17 communications facility that can be used in a conveyance of data
 18 between the at least one first CPE data device and the at least one RF
 19 cable interface;
 20 forwarding data between the at least one RF cable interface and the at least one
 21 customer premise data interface;
 22 multiplexing the data over the at least one customer premise data
 23 communications medium using frequency-division multiplexing, the at
 24 least one customer premise data communications medium being at
 25 least one wired customer premise data communications medium.

1 60. The method of claim 59, wherein the RF cable network device appears on the RF
 2 cable data network to be the same as an ethernet attached cable modem that conforms

to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

61. The method of claim 59, wherein the at least one wired customer premise data communications medium is telephone wiring at the customer premise, and wherein the data is frequency-division multiplexed with a signal for carrying an analog POTS voice-frequency band signal.

62. The method of claim 59, wherein the at least one wired customer premise data communications medium is electrical power wiring at the customer premise, and wherein the data is frequency-division multiplexed with a signal for carrying electrical power to appliances at the customer premise.

63. A method of providing data connectivity over an RF cable network, the method comprising the steps performed in a radio frequency (RF) cable network device of:
- providing at least one RF cable interface that is attachable to at least one RF cable, the at least one RF cable being at least part of an RF cable data network, the at least one RF cable at least providing downstream communications in the RF cable data network, the RF cable data network providing bi-directional data connectivity between the RF cable network device at a customer premise and a cable modem termination device;
 - providing at least one customer premise data interface that is electromagnetically connectable to at least one customer premise data communications medium, the at least one customer premise data communications medium further being electromagnetically connectable to at least one first customer premise equipment (CPE) data device, the at least one RF cable interface and the at least one customer premise data interface capable of providing at least part of a communications facility that can be used in a conveyance of data between the at least one first CPE data device and the at least one RF cable interface;
 - forwarding data between the at least one RF cable interface and the at least one customer premise data interface, the at least one customer premise data communications medium being at least one wireless customer premise data communications medium.

64. The method of claim 63, wherein the RF cable network device appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

65. The method of claim 63, wherein the at least one wireless customer premise data communications medium conforms to at least one version of at least one protocol selected from the group consisting of: Bluetooth, IEEE 802.11a, IEEE 802.11b, and HomeRF.

66. A method of providing IP connectivity to a set-top box (STB), the method comprising the steps performed in the set-top box of:
- providing at least one RF cable interface that is attachable to at least one RF cable audio/visual (A/V) network;
 - providing at least one audio/video (A/V) customer premise equipment (CPE) interface that is electromagnetically connectable to the at least one customer premise audio/video (A/V) communications medium;
 - selecting at least one audio/video (A/V) program that is communicated to the at least one RF cable interface over at least one RF cable audio/visual (A/V) network;
 - receiving the selected at least one A/V program from the RF cable A/V network;
 - providing the received at least one A/V program to at least one audio/video (A/V) customer premise equipment (CPE) device that is electromagnetically connectable to the at least one customer premise A/V communications medium, the at least one A/V program communicated through the at least one A/V CPE interface and over the at least one customer premise A/V communications medium;
 - providing at least one RF cable interface that is attachable to at least one RF cable, the at least one RF cable being at least part of an RF cable data network, the at least one RF cable at least providing downstream communications in the RF cable data network, the RF cable data network providing bi-directional data connectivity between the RF cable network device at a customer premise and a cable modem termination device;
 - storing information identifying at least one IP address, the at least one IP address being assigned to the set-top box; and
 - forwarding packets containing IP datagrams from the set-top box over the RF cable data network.

67. The method of claim 66, wherein the at least one A/V CPE device is selected from the group consisting of: a television, a video recorder, a stereo, and an audio recorder.

68. The method of claim 66 further comprising the step performed in the set-top box of:
 providing at least one customer premise data interface that is
 electromagnetically connectable to at least one customer premise data communications medium, the at least one customer premise data communications medium further being electromagnetically connectable to at least one first customer premise equipment (CPE) data device, the at least one RF cable interface and the at least one customer premise data interface capable of providing at least part of a communications facility that can be used in a conveyance of data between the at least one first CPE data device and the at least one RF cable interface.

69. The method of claim 68 further comprising the step performed in the set-top box of:
 providing at least one gateway service to the at least one first CPE data device, the at least one gateway service facilitating communications of the at least one first CPE data device that are carried in IP datagrams over the RF cable data network.

70. The method of claim 69, wherein the at least one gateway service is selected from the group consisting of: network address translation (NAT), firewall, proxy, tunneling, and virtual private networking (VPN).

71. The method of claim 70, wherein the set-top box appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

72. A radio frequency (RF) cable network device that implements at least one integrated gateway service, the device comprising:

- at least one RF cable interface that is attachable to at least one RF cable, the at least one RF cable being at least part of an RF cable data network, the at least one RF cable at least providing downstream communications in the RF cable data network, the RF cable data network providing bi-directional data connectivity between the RF cable network device at a customer premise and a cable modem termination device;
- at least one customer premise data interface that is electromagnetically connectable to at least one customer premise data communications medium, the at least one customer premise data communications medium further being electromagnetically connectable to at least one first customer premise equipment (CPE) data device, the at least one RF cable interface and the at least one customer premise data interface capable of providing at least part of a communications facility that can be used in a conveyance of data between the at least one first CPE data device and the at least one RF cable interface;
- logic configured to store information identifying at least one IP address, the at least one IP address being assigned to the RF cable network device;
- logic configured to maintain information that provides a forward direction mapping between first upstream data and second upstream data, the first upstream data being received on the at least one customer premise data interface and being received from the at least one first CPE data device, the second upstream data being transmitted into the RF cable data network and being transmitted by the RF cable network device;
- logic configured to maintain information that provides a reverse direction mapping between first downstream data and second downstream data, the first downstream data being received on the at least one RF cable interface and being received from the RF cable data network, the second downstream data being transmitted on the at least one customer

premise data interface and being transmitted by the RF cable network device;

logic configured to receive at least one first medium access control (MAC) frame that is at least part of the first upstream data;

logic configured to form at least one first IP datagram at least based upon the at least one first MAC frame, at least based upon the at least one IP address, and at least based upon the forward direction mapping, the at least one first IP datagram comprising a source IP address field, the at least one IP address being placed into the source IP address field of the at least one first IP datagram;

logic configured to transmit the at least one first IP datagram that is at least part of the second upstream data;

logic configured to receive at least one second IP datagram that is at least part of the first downstream data, the at least one second IP datagram comprising a destination IP address field that contains the at least one IP address;

logic configured to form at least one second medium access control (MAC) frame at least based upon the at least one second IP datagram, at least based upon the at least one IP address, and at least based upon the reverse direction mapping; and

logic configured to transmit the at least one second MAC frame that is at least part of the second downstream data.

73. The RF cable network device of claim 72, wherein the RF cable data network further comprises at least one telco return path that at least provides upstream communications in the RF cable data network.

74. The RF cable network device of claim 72, wherein the at least one first MAC frame comprises a third IP datagram, wherein the at least one second MAC frame comprises a fourth IP datagram, and wherein the RF cable network device is configured to

perform network address translation (NAT), NAT being a gateway service that translates information in IP datagrams.

75. The RF cable network device of claim 74, wherein the NAT performed is at least one type of NAT selected from the group consisting of: traditional NAT, basic NAT, network address-port translation (NAPT), bi-directional NAT, and twice NAT.

76. The RF cable network device of claim 74 being further configured to perform at least one application layer gateway (ALG) service.

77. The RF cable network device of claim 76, wherein the application layer gateway service provides gateway services to at least one version of at least one TCP/IP (transmission control protocol/internet protocol) suite application protocol that is selected from the group of consisting of: telnet, rlogin, file transfer protocol (FTP), trivial file transfer protocol (TFTP), network file system (NFS), electronic mail, simple mail transfer protocol (SMTP), post office protocol (POP), internet message access protocol (IMAP), multipurpose internet mail extensions (MIME), hyper-text transfer protocol (HTTP), real-time transport protocol (RTP), and simple network management protocol (SNMP).

78. The RF cable network device of claim 74, wherein the at least one customer premise communications medium is further electromagnetically connectable to at least one second customer premise equipment (CPE) data device that has IP connectivity through the RF cable network device to the RF cable data network without utilizing NAT.

79. The RF cable network device of claim 74, wherein the at least one customer premise communications medium is further electromagnetically connectable to at least one second customer premise equipment (CPE) data device, the RF cable network device further comprising logic configured to block IP connectivity between the at least one second customer premise equipment (CPE) data device and the RF cable data network.

80. The RF cable network device of claim 74, wherein the RF cable network device is a set-top box (STB) that further comprises:

- at least one audio/video (A/V) customer premise equipment (CPE) interface that is electromagnetically connectable to at least one customer premise audio/video (A/V) communications medium;
- logic configured to select at least one audio/video (A/V) program that is communicated to the at least one RF cable interface over at least one RF cable audio/visual (A/V) network;
- logic configured to receive the selected at least one A/V program from the RF cable A/V network; and
- logic configured to provide the received at least one A/V program to at least one audio/video (A/V) customer premise equipment (CPE) device that is electromagnetically connectable to the at least one customer premise A/V communications medium, the at least one A/V program communicated through the at least one A/V CPE interface and over the at least one customer premise A/V communications medium.

81. The set-top box of claim 80, wherein the at least one A/V CPE device is selected from the group consisting of: a television, a video recorder, a stereo, and an audio recorder.

82. The set-top box of claim 80, wherein the set-top box appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

83. The set-top box of claim 82, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the set-top box further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also

considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

84. The set-top box of claim 80, wherein the set-top box appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

85. The set-top box of claim 80, wherein at least one option card is added to a base unit of the set-top box to provide at least support for the performance of NAT by the set-top box.

86. The RF cable network device of claim 74, wherein the RF cable network device is a cable modem (CM).

87. The cable modem of claim 86, wherein the cable modem (CM) appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

88. The cable modem of claim 87, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the cable modem further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also considered to be assigned to the cable modem, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

89. The cable modem of claim 86, wherein the cable modem (CM) appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

- 1 90. The cable modem of claim 86, wherein at least one option card is added to a base unit
2 of the cable modem to provide at least support for the performance of NAT by the
3 cable modem.
- 1 91. The RF cable network device of claim 74, wherein the at least one customer premise
2 data communications medium is at least one wired customer premise data
3 communications medium.
- 1 92. The RF cable network device of claim 91, wherein at least one option card is added to
2 a base unit of the RF cable network device to provide at least support for the at least
3 one wired customer premise data communications medium.
- 1 93. The RF cable network device of claim 91, wherein the at least one wired customer
2 premise data communications medium is at least one communications medium that at
3 least utilizes time-division multiplexing.
- 1 94. The RF cable network device of claim 93, wherein the at least one wired customer
2 premise data communications medium is at least one selection from the group
3 consisting of: RS-232, RS-449, V.35, universal serial bus (USB), ethernet, and token
4 ring.

- 1 95. The RF cable network device of claim 93, wherein the RF cable network device is a
2 set-top box (STB) that further comprises:
3 at least one audio/video (A/V) customer premise equipment (CPE) interface
4 that is electromagnetically connectable to at least one customer
5 premise audio/video (A/V) communications medium;
6 logic configured to select at least one audio/video (A/V) program that is
7 communicated to the at least one RF cable interface over at least one
8 RF cable audio/visual (A/V) network;
9 logic configured to receive the selected at least one A/V program from the RF
10 cable A/V network; and
11 logic configured to provide the received at least one A/V program to at least
12 one audio/video (A/V) customer premise equipment (CPE) device that
13 is electromagnetically connectable to the at least one customer premise
14 A/V communications medium, the at least one A/V program
15 communicated through the at least one A/V CPE interface and over the
16 at least one customer premise A/V communications medium.
- 1 96. The set-top box of claim 95, wherein the at least one A/V CPE device is selected from
2 the group consisting of: a television, a video recorder, a stereo, and an audio recorder.
- 1 97. The set-top box of claim 95, wherein the set-top box appears on the RF cable data
2 network to be the same as an ethernet attached cable modem that conforms to at least
3 one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.
- 1 98. The set-top box of claim 97, wherein the at least one IP address is at least one
2 DOCSIS customer premise equipment (CPE) IP address, the set-top box further
3 comprising logic configured to store information identifying at least one DOCSIS
4 cable modem (CM) IP address, the at least one DOCSIS CM IP address also

considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

99. The set-top box of claim 95, wherein the set-top box appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

100. The RF cable network device of claim 93, wherein the RF cable network device is a cable modem (CM).

101. The cable modem of claim 100, wherein the cable modem (CM) appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

102. The cable modem of claim 101, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the cable modem further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also considered to be assigned to the cable modem, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

103. The cable modem of claim 100, wherein the cable modem (CM) appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

104. The RF cable network device of claim 91, wherein the at least one wired customer premise data communications medium at least utilizes frequency-division multiplexing.

105. The RF cable network device of claim 104, wherein the at least one wired customer premise data communications medium is telephone wiring at the customer premise, and wherein IP datagrams are frequency-division multiplexed with a signal for carrying an analog POTS voice-frequency band signal.

106. The RF cable network device of claim 105, wherein the at least one wired customer premise data communications medium conforms to at least one version of a Home Phoneline Networking Alliance (HPNA) standard.

107. The RF cable network device of claim 105, wherein the RF cable network device is a set-top box (STB) that further comprises:

at least one audio/video (A/V) customer premise equipment (CPE) interface that is electromagnetically connectable to at least one customer premise audio/video (A/V) communications medium;

logic configured to select at least one audio/video (A/V) program that is communicated to the at least one RF cable interface over at least one RF cable audio/visual (A/V) network;

logic configured to receive the selected at least one A/V program from the RF cable A/V network; and

logic configured to provide the received at least one A/V program to at least one audio/video (A/V) customer premise equipment (CPE) device that is electromagnetically connectable to the at least one customer premise A/V communications medium, the at least one A/V program communicated through the at least one A/V CPE interface and over the at least one customer premise A/V communications medium.

108. The set-top box of claim 107, wherein the at least one A/V CPE device is selected from the group consisting of: a television, a video recorder, a stereo, and an audio recorder.

109. The set-top box of claim 107, wherein the set-top box appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

110. The set-top box of claim 109, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the set-top box further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also

considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

111. The set-top box of claim 107, wherein the set-top box appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

112. The RF cable network device of claim 105, wherein the RF cable network device is a cable modem (CM).

113. The cable modem of claim 112, wherein the cable modem (CM) appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

114. The cable modem of claim 113, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the cable modem further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also considered to be assigned to the cable modem, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

115. The cable modem of claim 112, wherein the cable modem (CM) appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

116. The RF cable network device of claim 104, wherein the at least one wired customer premise data communications medium is electrical power wiring at the customer premise, and wherein IP datagrams is frequency-division multiplexed with a signal for carrying electrical power to appliances at the customer premise.

117. The RF cable network device of claim 116, wherein the at least one wired customer premise data communications medium conforms to at least one version of at least one protocol selected from the group consisting of: X.10, CEBus, and PowerPacket.

118. The RF cable network device of claim 116, wherein the RF cable network device is a set-top box (STB) that further comprises:

- at least one audio/video (A/V) customer premise equipment (CPE) interface that is electromagnetically connectable to at least one customer premise audio/video (A/V) communications medium;
- logic configured to select at least one audio/video (A/V) program that is communicated to the at least one RF cable interface over at least one RF cable audio/visual (A/V) network;
- logic configured to receive the selected at least one A/V program from the RF cable A/V network; and
- logic configured to provide the received at least one A/V program to at least one audio/video (A/V) customer premise equipment (CPE) device that is electromagnetically connectable to the at least one customer premise A/V communications medium, the at least one A/V program communicated through the at least one A/V CPE interface and over the at least one customer premise A/V communications medium.

119. The set-top box of claim 118, wherein the at least one A/V CPE device is selected from the group consisting of: a television, a video recorder, a stereo, and an audio recorder.

120. The set-top box of claim 118, wherein the set-top box appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

121. The set-top box of claim 120, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the set-top box further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

122. The set-top box of claim 118, wherein the set-top box appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

123. The RF cable network device of claim 116, wherein the RF cable network device is a cable modem (CM).

124. The cable modem of claim 123, wherein the cable modem (CM) appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

- 1 125. The cable modem of claim 124, wherein the at least one IP address is at least one
2 DOCSIS customer premise equipment (CPE) IP address, the cable modem further
3 comprising logic configured to store information identifying at least one DOCSIS
4 cable modem (CM) IP address, the at least one DOCSIS CM IP address also
5 considered to be assigned to the cable modem, the at least one DOCSIS CPE IP
6 address being different from the at least one DOCSIS CM IP address.
- 1 126. The cable modem of claim 123, wherein the cable modem (CM) appears on the RF
2 cable data network to conform to at least one version of a DAVIC (Digital Audio
Visual Council) cable modem standard.
127. The RF cable network device of claim 74, wherein the at least one customer premise
data communications medium is at least one wireless customer premise data
communications medium.
128. The RF cable network device of claim 127, wherein at least one option card is added
to a base unit of the RF cable network device to provide at least support for the at least
one wireless customer premise data communications medium.
- 1 129. The RF cable network device of claim 128, wherein the at least one wireless customer
2 premise data communications medium conforms to at least one version of at least one
3 protocol selected from the group consisting of: Bluetooth, IEEE 802.11a, IEEE
4 802.11b, and HomeRF.

1 130. The RF cable network device of claim 127, wherein the RF cable network device is a
2 set-top box (STB) that further comprises:

3 at least one audio/video (A/V) customer premise equipment (CPE) interface
4 that is electromagnetically connectable to at least one customer
5 premise audio/video (A/V) communications medium;

6 logic configured to select at least one audio/video (A/V) program that is
7 communicated to the at least one RF cable interface over at least one
8 RF cable audio/visual (A/V) network;

9 logic configured to receive the selected at least one A/V program from the RF
10 cable A/V network; and

11 logic configured to provide the received at least one A/V program to at least
12 one audio/video (A/V) customer premise equipment (CPE) device that
13 is electromagnetically connectable to the at least one customer premise
14 A/V communications medium, the at least one A/V program
15 communicated through the at least one A/V CPE interface and over the
16 at least one customer premise A/V communications medium.

1 131. The set-top box of claim 130, wherein the at least one A/V CPE device is selected
2 from the group consisting of: a television, a video recorder, a stereo, and an audio
3 recorder.

1 132. The set-top box of claim 130, wherein the set-top box appears on the RF cable data
2 network to be the same as an ethernet attached cable modem that conforms to at least
3 one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

1 133. The set-top box of claim 132, wherein the at least one IP address is at least one
2 DOCSIS customer premise equipment (CPE) IP address, the set-top box further
3 comprising logic configured to store information identifying at least one DOCSIS
4 cable modem (CM) IP address, the at least one DOCSIS CM IP address also

considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

134. The set-top box of claim 132, wherein the set-top box appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

135. The RF cable network device of claim 127, wherein the RF cable network device is a cable modem (CM).

136. The cable modem of claim 135, wherein the cable modem (CM) appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

137. The cable modem of claim 136, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the cable modem further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also considered to be assigned to the cable modem, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

138. The cable modem of claim 135, wherein the cable modem (CM) appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

139. The RF cable network device of claim 74, wherein the RF cable network device further comprises logic configured to implement a Dynamic Host Configuration Protocol (DHCP) client that dynamically obtains the assignment of the least one IP address.

1 140. The RF cable network device of claim 139, wherein the RF cable network device is a
2 set-top box (STB) that further comprises:

3 at least one audio/video (A/V) customer premise equipment (CPE) interface
4 that is electromagnetically connectable to at least one customer
5 premise audio/video (A/V) communications medium;

6 logic configured to select at least one audio/video (A/V) program that is
7 communicated to the at least one RF cable interface over at least one
8 RF cable audio/visual (A/V) network;

9 logic configured to receive the selected at least one A/V program from the RF
10 cable A/V network; and

11 logic configured to provide the received at least one A/V program to at least
12 one audio/video (A/V) customer premise equipment (CPE) device that
13 is electromagnetically connectable to the at least one customer premise
14 A/V communications medium, the at least one A/V program
15 communicated through the at least one A/V CPE interface and over the
16 at least one customer premise A/V communications medium.

1 141. The set-top box of claim 140, wherein the at least one A/V CPE device is selected
2 from the group consisting of: a television, a video recorder, a stereo, and an audio
3 recorder.

1 142. The set-top box of claim 140, wherein the set-top box appears on the RF cable data
2 network to be the same as an ethernet attached cable modem that conforms to at least
3 one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

1 143. The set-top box of claim 142, wherein the at least one IP address is at least one
2 DOCSIS customer premise equipment (CPE) IP address, the set-top box further
3 comprising logic configured to store information identifying at least one DOCSIS
4 cable modem (CM) IP address, the at least one DOCSIS CM IP address also

considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

144. The set-top box of claim 140, wherein the set-top box appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

145. The RF cable network device of claim 139, wherein the RF cable network device is a cable modem (CM).

146. The cable modem of claim 145, wherein the cable modem (CM) appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

147. The cable modem of claim 146, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the cable modem further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also considered to be assigned to the cable modem, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

148. The cable modem of claim 145, wherein the cable modem (CM) appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

149. The RF cable network device of claim 74, wherein the RF cable network device further comprises logic configured to perform as a Dynamic Host Configuration Protocol (DHCP) server that assigns at least one customer network IP address to the at

least one first CPE data device connected to the at least one customer premise data communications medium.

150. The RF cable network device of claim 149, wherein the at least one customer network IP address is from a different IP address realm than the at least one IP address for RF cable data network access.

- 1 151. The RF cable network device of claim 149, wherein the RF cable network device is a
 2 set-top box (STB) that further comprises:
 3 at least one audio/video (A/V) customer premise equipment (CPE) interface
 4 that is electromagnetically connectable to at least one customer
 5 premise audio/video (A/V) communications medium;
 6 logic configured to select at least one audio/video (A/V) program that is
 7 communicated to the at least one RF cable interface over at least one
 8 RF cable audio/visual (A/V) network;
 9 logic configured to receive the selected at least one A/V program from the RF
 10 cable A/V network; and
 11 logic configured to provide the received at least one A/V program to at least
 12 one audio/video (A/V) customer premise equipment (CPE) device that
 13 is electromagnetically connectable to the at least one customer premise
 14 A/V communications medium, the at least one A/V program
 15 communicated through the at least one A/V CPE interface and over the
 16 at least one customer premise A/V communications medium.
- 1 152. The set-top box of claim 151, wherein the at least one A/V CPE device is selected
 2 from the group consisting of: a television, a video recorder, a stereo, and an audio
 3 recorder.
- 1 153. The set-top box of claim 151, wherein the set-top box appears on the RF cable data
 2 network to be the same as an ethernet attached cable modem that conforms to at least
 3 one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.
- 1 154. The set-top box of claim 153, wherein the at least one IP address is at least one
 2 DOCSIS customer premise equipment (CPE) IP address, the set-top box further
 3 comprising logic configured to store information identifying at least one DOCSIS
 4 cable modem (CM) IP address, the at least one DOCSIS CM IP address also

considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

155. The set-top box of claim 151, wherein the set-top box appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

156. The RF cable network device of claim 149, wherein the RF cable network device is a cable modem (CM).

157. The cable modem of claim 156, wherein the cable modem (CM) appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

158. The cable modem of claim 157, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the cable modem further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also considered to be assigned to the cable modem, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

159. The cable modem of claim 156, wherein the cable modem (CM) appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

160. The RF cable network device of claim 72, wherein the RF cable network device is configured to perform the at least one integrated gateway service, the at least one integrated gateway service being selected from the group consisting of: firewall and proxy.

161. The RF cable network device of claim 160, wherein at least one option card is added to a base unit of the RF cable network device to provide at least support for the at least one integrated gateway service.

162. The RF cable network device of claim 160, wherein the RF cable network device is a set-top box (STB) that further comprises:

- at least one audio/video (A/V) customer premise equipment (CPE) interface that is electromagnetically connectable to at least one customer premise audio/video (A/V) communications medium;
- logic configured to select at least one audio/video (A/V) program that is communicated to the at least one RF cable interface over at least one RF cable audio/visual (A/V) network;
- logic configured to receive the selected at least one A/V program from the RF cable A/V network; and
- logic configured to provide the received at least one A/V program to at least one audio/video (A/V) customer premise equipment (CPE) device that is electromagnetically connectable to the at least one customer premise A/V communications medium, the at least one A/V program communicated through the at least one A/V CPE interface and over the at least one customer premise A/V communications medium.

163. The set-top box of claim 162, wherein the at least one A/V CPE device is selected from the group consisting of: a television, a video recorder, a stereo, and an audio recorder.

164. The set-top box of claim 162, wherein the set-top box appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

- 1 165. The set-top box of claim 164, wherein the at least one IP address is at least one
2 DOCSIS customer premise equipment (CPE) IP address, the set-top box further
3 comprising logic configured to store information identifying at least one DOCSIS
4 cable modem (CM) IP address, the at least one DOCSIS CM IP address also
5 considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address
6 being different from the at least one DOCSIS CM IP address.
- 1 166. The set-top box of claim 162, wherein the set-top box appears on the RF cable data
2 network to conform to at least one version of a DAVIC (Digital Audio Visual
3 Council) cable modem standard.
- 1 167. The RF cable network device of claim 160, wherein the RF cable network device is a
2 cable modem (CM).
- 1 168. The cable modem of claim 167, wherein the cable modem (CM) appears on the RF
2 cable data network to be the same as an ethernet attached cable modem that conforms
3 to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification)
4 standard.

- 1 169. The cable modem of claim 168, wherein the at least one IP address is at least one
2 DOCSIS customer premise equipment (CPE) IP address, the cable modem further
3 comprising logic configured to store information identifying at least one DOCSIS
4 cable modem (CM) IP address, the at least one DOCSIS CM IP address also
5 considered to be assigned to the cable modem, the at least one DOCSIS CPE IP
6 address being different from the at least one DOCSIS CM IP address.
- 1 170. The cable modem of claim 167, wherein the cable modem (CM) appears on the RF
2 cable data network to conform to at least one version of a DAVIC (Digital Audio
3 Visual Council) cable modem standard.
- 1 171. The RF cable network device of claim 160, wherein the firewall gateway service
2 performs at least one of the firewall types selected from the group consisting of:
3 packet-filtering, circuit-level gateway, and application layer gateway.
- 1 172. The RF cable network device of claim 171, wherein the packet-filtering firewall type
2 performs state-based packet-filtering.
- 1 173. The RF cable network device of claim 160, wherein the at least one integrated
2 gateway service performs at least one of the gateway service types selected from the
3 group consisting of: circuit-level gateway and application layer gateway.
- 1 174. The RF cable network device of claim 173, wherein the at least one integrated
2 gateway service type operates on IP datagrams.
- 1 175. The RF cable network device of claim 173, wherein the at least one integrated
2 gateway service type converts network layer protocols.

176. The RF cable network device of claim 173, wherein the at least one integrated gateway service type converts network protocols between the network layer protocols of IPX (Internet Packet eXchange) and IP (Internet Protocol).

177. The RF cable network device of claim 160, wherein the RF cable network device further comprises logic configured to perform as a Dynamic Host Configuration Protocol (DHCP) server that assigns at least one customer network IP address to the at least one first CPE data device connected to the at least one customer premise data communications medium.

178. The RF cable network device of claim 177, wherein the RF cable network device is a set-top box (STB) that further comprises:

- at least one audio/video (A/V) customer premise equipment (CPE) interface that is electromagnetically connectable to at least one customer premise audio/video (A/V) communications medium;
- logic configured to select at least one audio/video (A/V) program that is communicated to the at least one RF cable interface over at least one RF cable audio/visual (A/V) network;
- logic configured to receive the selected at least one A/V program from the RF cable A/V network; and
- logic configured to provide the received at least one A/V program to at least one audio/video (A/V) customer premise equipment (CPE) device that is electromagnetically connectable to the at least one customer premise A/V communications medium, the at least one A/V program communicated through the at least one A/V CPE interface and over the at least one customer premise A/V communications medium.

179. The set-top box of claim 178, wherein the at least one A/V CPE device is selected from the group consisting of: a television, a video recorder, a stereo, and an audio recorder.

180. The set-top box of claim 178, wherein the set-top box appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

181. The set-top box of claim 180, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the set-top box further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

182. The set-top box of claim 178, wherein the set-top box appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

183. The RF cable network device of claim 177, wherein the RF cable network device is a cable modem (CM).

184. The cable modem of claim 183, wherein the cable modem (CM) appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

- 1 185. The cable modem of claim 184, wherein the at least one IP address is at least one
2 DOCSIS customer premise equipment (CPE) IP address, the cable modem further
3 comprising logic configured to store information identifying at least one DOCSIS
4 cable modem (CM) IP address, the at least one DOCSIS CM IP address also
5 considered to be assigned to the cable modem, the at least one DOCSIS CPE IP
6 address being different from the at least one DOCSIS CM IP address.
- 1 186. The cable modem of claim 183, wherein the cable modem (CM) appears on the RF
2 cable data network to conform to at least one version of a DAVIC (Digital Audio
3 Visual Council) cable modem standard.
- 1 187. The RF cable network device of claim 72, wherein the RF cable network device is
2 configured to perform the at least one integrated gateway service, the at least one
3 integrated gateway service being selected from the group consisting of: tunneling and
4 virtual private networking (VPN).
- 1 188. The RF cable network device of claim 187, wherein at least one option card is added
2 to a base unit of the RF cable network device to provide at least support for the at least
3 one integrated gateway service.

189. The RF cable network device of claim 187, wherein the RF cable network device is a set-top box (STB) that further comprises:

- at least one audio/video (A/V) customer premise equipment (CPE) interface that is electromagnetically connectable to at least one customer premise audio/video (A/V) communications medium;
- logic configured to select at least one audio/video (A/V) program that is communicated to the at least one RF cable interface over at least one RF cable audio/visual (A/V) network;
- logic configured to receive the selected at least one A/V program from the RF cable A/V network; and
- logic configured to provide the received at least one A/V program to at least one audio/video (A/V) customer premise equipment (CPE) device that is electromagnetically connectable to the at least one customer premise A/V communications medium, the at least one A/V program communicated through the at least one A/V CPE interface and over the at least one customer premise A/V communications medium.

190. The set-top box of claim 189, wherein the at least one A/V CPE device is selected from the group consisting of: a television, a video recorder, a stereo, and an audio recorder.

191. The set-top box of claim 189, wherein the set-top box appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

192. The set-top box of claim 191, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the set-top box further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also

considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

193. The set-top box of claim 189, wherein the set-top box appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

194. The RF cable network device of claim 187, wherein the RF cable network device is a cable modem (CM).

195. The cable modem of claim 195, wherein the cable modem (CM) appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

196. The cable modem of claim 195, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the cable modem further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also considered to be assigned to the cable modem, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

197. The cable modem of claim 194, wherein the cable modem (CM) appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

198. The RF cable network device of claim 187, wherein the at least one integrated service communicates encapsulated information in IP datagrams over the RF cable network.

199. The RF cable network device of claim 198, wherein the at least one integrated service at least one service utilizing at least one version of at least one protocol selected from the group consisting of: generic routing encapsulation (GRE), Ascend tunnel management protocol (ATMP), point-to-point tunneling protocol (PPTP), layer two forwarding (L2F) protocol, layer two tunneling protocol (L2TP), IP Security (IPSec), and multi-protocol label switching (MPLS).

200. The RF cable network device of claim 187, wherein the RF cable network device further comprises logic configured to perform as a Dynamic Host Configuration Protocol (DHCP) server that assigns at least one customer network IP address to the at least one first CPE data device connected to the at least one customer premise data communications medium.

1 201. The RF cable network device of claim 200, wherein the RF cable network device is a
 2 set-top box (STB) that further comprises:
 3 at least one audio/video (A/V) customer premise equipment (CPE) interface
 4 that is electromagnetically connectable to at least one customer
 5 premise audio/video (A/V) communications medium;
 6 logic configured to select at least one audio/video (A/V) program that is
 7 communicated to the at least one RF cable interface over at least one
 8 RF cable audio/visual (A/V) network;
 9 logic configured to receive the selected at least one A/V program from the RF
 10 cable A/V network; and
 11 logic configured to provide the received at least one A/V program to at least
 12 one audio/video (A/V) customer premise equipment (CPE) device that
 13 is electromagnetically connectable to the at least one customer premise
 14 A/V communications medium, the at least one A/V program
 15 communicated through the at least one A/V CPE interface and over the
 16 at least one customer premise A/V communications medium.

1 202. The set-top box of claim 201, wherein the at least one A/V CPE device is selected
 2 from the group consisting of: a television, a video recorder, a stereo, and an audio
 3 recorder.

1 203. The set-top box of claim 201, wherein the set-top box appears on the RF cable data
 2 network to be the same as an ethernet attached cable modem that conforms to at least
 3 one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

1 204. The set-top box of claim 203, wherein the at least one IP address is at least one
 2 DOCSIS customer premise equipment (CPE) IP address, the set-top box further
 3 comprising logic configured to store information identifying at least one DOCSIS
 4 cable modem (CM) IP address, the at least one DOCSIS CM IP address also

considered to be assigned to the set-top box, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

205. The set-top box of claim 201, wherein the set-top box appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

206. The RF cable network device of claim 200, wherein the RF cable network device is a cable modem (CM).

207. The cable modem of claim 206, wherein the cable modem (CM) appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

208. The cable modem of claim 207, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the cable modem further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also considered to be assigned to the cable modem, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

209. The cable modem of claim 206, wherein the cable modem (CM) appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

210. A method of implementing at least one integrated gateway service in a radio frequency (RF) cable network device, the method comprising the steps performed in the RF cable network device of:

providing at least one RF cable interface that is attachable to at least one RF cable, the at least one RF cable being at least part of an RF cable data network, the at least one RF cable at least providing downstream communications in the RF cable data network, the RF cable data network providing bi-directional data connectivity between the RF cable network device at a customer premise and a cable modem termination device;

providing at least one customer premise data interface that is electromagnetically connectable to at least one customer premise data communications medium, the at least one customer premise data communications medium further being electromagnetically connectable to at least one first customer premise equipment (CPE) data device, the at least one RF cable interface and the at least one customer premise data interface capable of providing at least part of a communications facility that can be used in a conveyance of data between the at least one first CPE data device and the at least one RF cable interface;

storing information identifying at least one IP address, the at least one IP address being assigned to the RF cable network device;

maintaining information that provides a forward direction mapping between first upstream data and second upstream data, the first upstream data being received on the at least one customer premise data interface and being received from the at least one first CPE data device, the second upstream data being transmitted into the RF cable data network and being transmitted by the RF cable network device;

maintaining information that provides a reverse direction mapping between first downstream data and second downstream data, the first downstream data being received on the at least one RF cable interface and being received from the RF cable data network, the second downstream data being transmitted on the at least one customer

premise data interface and being transmitted by the RF cable network device;

receiving at least one first medium access control (MAC) frame that is at least part of the first upstream data;

forming at least one first IP datagram at least based upon the at least one first MAC frame, at least based upon the at least one IP address, and at least based upon the forward direction mapping, the at least one first IP datagram comprising a source IP address field, the at least one IP address being placed into the source IP address field of the at least one first IP datagram;

transmitting the at least one first IP datagram that is at least part of the second upstream data;

receiving at least one second IP datagram that is at least part of the first downstream data, the at least one second IP datagram comprising a destination IP address field that contains the at least one IP address;

forming at least one second medium access control (MAC) frame at least based upon the at least one second IP datagram, at least based upon the at least one IP address, and at least based upon the reverse direction mapping; and

transmitting the at least one second MAC frame that is at least part of the second downstream data.

211. The method of claim 210, wherein the RF cable data network further comprises at least one telco return path that at least provides upstream communications in the RF cable data network.

212. The method of claim 210, wherein the at least one first MAC frame comprises a third IP datagram, wherein the at least one second MAC frame comprises a fourth IP datagram, and wherein the method of implementing at least one integrated gateway

service is used in performing network address translation (NAT), NAT being a gateway service that translates information in IP datagrams.

213. The method of claim 212, wherein the logic configured to perform NAT performs at least one type of NAT selected from the group consisting of: traditional NAT, basic NAT, network address-port translation (NAPT), bi-directional NAT, and twice NAT.

214. The method of claim 210, wherein the method of implementing at least one integrated gateway service is used in performing at least one type of service that is selected from the group consisting of: firewall and proxy.

215. The method of claim 210, wherein the method of implementing at least one integrated gateway service is used in performing at least one type of service that is selected from the group consisting of: tunneling and virtual private networking (VPN).

216. A radio frequency (RF) cable network device with integrated user processes, the device comprising:

- at least one RF cable interface that is attachable to at least one RF cable, the at least one RF cable being at least part of an RF cable data network, the at least one RF cable at least providing downstream communications in the RF cable data network, the RF cable data network providing bi-directional data connectivity between the RF cable network device at a customer premise and a cable modem termination device;
- logic configured to store at least one cable modem (CM) IP address assigned to the RF cable network device;
- logic configured to store at least one customer premise equipment (CPE) IP address assigned to the RF cable network device, the at least one CPE IP address being different from the at least one CM IP address; and
- logic configured to provide at least one user process, the at least one CPE IP address being in a source IP address field of at least one first IP datagram that carries information from the at least one user process, the at least one first IP datagram being communicated over the RF cable data network.

217. The RF cable network device of claim 216, wherein the RF cable data network further comprises at least one telco return path that at least provides upstream communications in the RF cable data network.

1 218. The RF cable network device of claim 216, wherein the RF cable network device
 2 further comprises logic configured to run at least one management and configuration
 3 application that communicates with service provider equipment and that is used to
 4 manage and configure the RF cable network device, the at least one CM IP address
 5 being in a source IP address field of at least one second IP datagram that carries
 6 information from the at least one management and configuration application, the at
 7 least one second IP datagram being communicated over the RF cable data network.

1 219. The RF cable network device of claim 218, wherein the at least one management and
 2 configuration application uses at least version of at least one of the protocols selected
 3 from the group consisting of: bootstrap protocol (BOOTP), dynamic host
 4 configuration protocol (DHCP), trivial file transfer protocol (TFTP), and simple
 5 network management protocol (SNMP).

1 220. The RF cable network device of claim 216, wherein the at least one user process
 2 communicates over the RF cable network using at least one version of at least one
 3 TCP/IP (transmission control protocol/internet protocol) suite application protocol
 4 that is selected from the group of consisting of: telnet, rlogin, file transfer protocol
 5 (FTP), network file system (NFS), electronic mail, simple mail transfer protocol
 6 (SMTP), post office protocol (POP), internet message access protocol (IMAP),
 7 multipurpose internet mail extensions (MIME), hyper-text transfer protocol (HTTP),
 8 and real-time transport protocol (RTP).

1 221. The RF cable network device of claim 216, wherein the at least one user process
 2 provides at least one gateway service selected from the group consisting of: network
 3 address translation (NAT), firewall, proxy, tunneling, and virtual private networking
 4 (VPN).

222. The RF cable network device of claim 216, wherein the RF cable network device is a set-top box (STB) that further comprises:

- at least one audio/video (A/V) customer premise equipment (CPE) interface that is electromagnetically connectable to at least one customer premise audio/video (A/V) communications medium;
- logic configured to select at least one audio/video (A/V) program that is communicated to the at least one RF cable interface over at least one RF cable audio/visual (A/V) network;
- logic configured to receive the selected at least one A/V program from the RF cable A/V network; and
- logic configured to provide the received at least one A/V program to at least one audio/video (A/V) customer premise equipment (CPE) device that is electromagnetically connectable to the at least one customer premise A/V communications medium, the at least one A/V program communicated through the at least one A/V CPE interface and over the at least one customer premise A/V communications medium.

223. The set-top box of claim 222, wherein the at least one A/V CPE device is selected from the group consisting of: a television, a video recorder, a stereo, and an audio recorder.

224. The set-top box of claim 222, wherein the set-top box appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

225. The set-top box of claim 222, wherein the set-top box appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

226. The RF cable network device of claim 216, wherein the RF cable network device is a cable modem (CM).

227. The cable modem of claim 226, wherein the cable modem (CM) appears on the RF cable data network to be the same as an ethernet attached cable modem that conforms to at least one version of a DOCSIS (Data-Over-Cable Service Interface Specification) standard.

228. The cable modem of claim 226, wherein the at least one IP address is at least one DOCSIS customer premise equipment (CPE) IP address, the cable modem further comprising logic configured to store information identifying at least one DOCSIS cable modem (CM) IP address, the at least one DOCSIS CM IP address also considered to be assigned to the cable modem, the at least one DOCSIS CPE IP address being different from the at least one DOCSIS CM IP address.

229. The cable modem of claim 226, wherein the cable modem (CM) appears on the RF cable data network to conform to at least one version of a DAVIC (Digital Audio Visual Council) cable modem standard.

- 1 230. A method of implementing at least one integrated user process in a radio frequency
 2 (RF) cable network device, the method comprising the steps performed in the RF
 3 cable network device of:
 4 providing at least one RF cable interface that is attachable to at least one RF
 5 cable, the at least one RF cable being at least part of an RF cable data
 6 network, the at least one RF cable at least providing downstream
 7 communications in the RF cable data network, the RF cable data
 8 network providing bi-directional data connectivity between the RF
 9 cable network device at a customer premise and a cable modem
 10 termination device;
 11 storing at least one cable modem (CM) IP address assigned to the RF cable
 12 network device;
 13 storing at least one customer premise equipment (CPE) IP address assigned to
 14 the RF cable network device, the at least one CPE IP address being
 15 different from the at least one CM IP address; and
 16 providing at least one user process, the at least one CPE IP address being in a
 17 source IP address field of at least one IP datagram that carries
 18 information from the at least one user process, the at least one IP
 19 datagram being communicated over the RF cable data network.

- 1 231. The method claim 230, wherein the RF cable data network further comprises at least
 2 one telco return path that at least provides upstream communications in the RF cable
 3 data network.

1 232. The method of claim 230 further comprising the step of running at least one
 2 management and configuration application that communicates with service provider
 3 equipment and that is used to manage and configure the RF cable network device, the
 4 at least one CM IP address being in a source IP address field of at least one second IP
 5 datagram that carries information from the at least one management and configuration
 6 application, the at least one second IP datagram being communicated over the RF
 7 cable data network.

1 233. The method of claim 232, wherein the at least one management and configuration
 2 application uses at least version of at least one of the protocols selected from the
 3 group consisting of: bootstrap protocol (BOOTP), dynamic host configuration
 4 protocol (DHCP), trivial file transfer protocol (TFTP), and simple network
 5 management protocol (SNMP).

1 234. The method of claim 230, wherein the at least one user process communicates over
 2 the RF cable network using at least one version of at least one TCP/IP (transmission
 3 control protocol/internet protocol) suite application protocol that is selected from the
 4 group of consisting of: telnet, rlogin, file transfer protocol (FTP), network file system
 5 (NFS), electronic mail, simple mail transfer protocol (SMTP), post office protocol
 6 (POP), internet message access protocol (IMAP), multipurpose internet mail
 7 extensions (MIME), hyper-text transfer protocol (HTTP), and real-time transport
 8 protocol (RTP).

1 235. The method of claim 230, wherein the at least one user process provides at least one
 2 gateway service selected from the group consisting of: network address translation
 3 (NAT), firewall, proxy, tunneling, and virtual private networking (VPN).